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# NiceZyme View of ENZYME: EC 4.2.1.94

**Official Name**
**Scytalone dehydratase.**
**Reaction catalysed**

 Scytalone <=> 1,3,8-trihydroxynaphthalene + H<sub>2</sub>O

**Comment(s)**

Involved with EC 1.1.1.252 in the biosynthesis of melanin in pathogenic fungi.

**Cross-references**

 BREND<sub>A</sub> 4.2.1.94

PUMA2 4.2.1.94

PRIAM enzyme-specific profiles 4.2.1.94

KEGG Ligand Database for Enzyme Nomenclature 4.2.1.94

IUBMB Enzyme Nomenclature 4.2.1.94

IntEnz 4.2.1.94

MEDLINE Find literature relating to 4.2.1.94

MetaCyc 4.2.1.94

UniProtKB/Swiss-Prot 014434, SCYD\_ASOFU; Q00455, SCYD\_GLOLA; P56221, SCYD\_MAGGR

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11-975

208143

STIC-Biotech/ChemLib

LB

CRFE

From: Ramirez, Delia  
Sent: 78701 Tuesday, November 21, 2006 1:44 PM  
To: STIC-Biotech/ChemLib  
Subject: 10/507132

Hi,

I would like to request the following searches:

1. SEQ ID NO:1 and 2 in the nucleic acid databases (commercial & interference)
2. SEQ ID NO:2 in the protein databases (commercial & interference)
3. an alignment of SEQ ID NO:2 and 4.

Please provide a printout of the results.

Thank you very much,

Delia M. Ramirez, Ph.D.  
Patent Examiner  
Recombinant Enzymes-Art Unit 1652  
USPTO  
400 Dulany Street, Remsen Bldg., 2D74, Mail room 2C70  
Alexandria, VA 22314  
(571) 272-0938  
delia.ramirez@uspto.gov

1 - 516aa  
2 - 172aa  
4 - 172 aa  
CB

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Searcher: \_\_\_\_\_  
Searcher Phone: \_\_\_\_\_  
Date Searcher Picked up: \_\_\_\_\_  
Date completed: \_\_\_\_\_  
Searcher Prep Time: \_\_\_\_\_  
Online Time: \_\_\_\_\_

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Type of Search  
NA# \_\_\_\_\_ AA#: \_\_\_\_\_  
S/L: \_\_\_\_\_ Oligomer: \_\_\_\_\_  
Encode/Transl: \_\_\_\_\_  
Structure #: \_\_\_\_\_ Text: \_\_\_\_\_  
Inventor: \_\_\_\_\_ Litigation: \_\_\_\_\_

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Vendors and cost where applicable  
STN: \_\_\_\_\_  
DIALOG: \_\_\_\_\_  
QUESTEL/ORBIT: \_\_\_\_\_  
LEXIS/NEXIS: \_\_\_\_\_  
SEQUENCE SYSTEM: \_\_\_\_\_  
WWW/Internet: \_\_\_\_\_  
Other (Specify): \_\_\_\_\_

11975

STIC-Biotech/ChemLib

CB

From: Ramirez, Delia  
Sent: Tuesday, November 21, 2006 1:53 PM  
To: STIC-Biotech/ChemLib  
Subject: 10/507132

CRFE

Hi,

I would like to request the following search: an oligo search of SEQ ID NO:4 in the protein and nucleic acid databases (commercial).

Please provide a printout of the results.

Thank you very much,

---

Delia M. Ramirez, Ph.D.  
Patent Examiner  
Recombinant Enzymes-Art Unit 1652  
USPTO  
400 Dulany Street, Remsen Bldg., 2D74, Mail room 2C70  
Alexandria, VA 22314  
(571) 272-0938  
delia.ramirez@uspto.gov



4-172aa  
LB

\*\*\*\*\*  
Searcher: \_\_\_\_\_  
Searcher Phone: \_\_\_\_\_  
Date Searcher Picked up: \_\_\_\_\_  
Date completed: \_\_\_\_\_  
Searcher Prep Time: \_\_\_\_\_  
Online Time: \_\_\_\_\_

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Type of Search  
NA# \_\_\_\_\_ AA#: \_\_\_\_\_  
S/L: \_\_\_\_\_ Oligomer: \_\_\_\_\_  
Encode/Transl: \_\_\_\_\_  
Structure #: \_\_\_\_\_ Text: \_\_\_\_\_  
Inventor: \_\_\_\_\_ Litigation: \_\_\_\_\_

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Vendors and cost where applicable  
STN: \_\_\_\_\_  
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<input type="checkbox"/>	L1	scytalon\$4 same dehydratas\$4	6

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### Search Results - Record(s) 1 through 6 of 6 returned.

1. Document ID: US 20060257976 A1

L1: Entry 1 of 6

File: PGPB

Nov 16, 2006

PGPUB-DOCUMENT-NUMBER: 20060257976

PGPUB-FILING-TYPE:

DOCUMENT-IDENTIFIER: US 20060257976 A1

TITLE: Methods and kits for propagating and evolving nucleic acids and proteins

PUBLICATION-DATE: November 16, 2006

## INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Makeyev; Eugene	Cambridge	MA	US
Bamford; Dennis	Helsinki		FI

US-CL-CURRENT: [435/91.2](#); [435/253.4](#), [435/325](#)[Full](#) [Title](#) [Citation](#) [Front](#) [Review](#) [Classification](#) [Date](#) [Reference](#) [Sequences](#) [Attachments](#) [Claims](#) [KIMC](#) [Draw Desc](#) [Image](#)

2. Document ID: US 20060223136 A1

L1: Entry 2 of 6

File: PGPB

Oct 5, 2006

PGPUB-DOCUMENT-NUMBER: 20060223136

PGPUB-FILING-TYPE:

DOCUMENT-IDENTIFIER: US 20060223136 A1

TITLE: Scytalone dehydrogenase gene showing tolerance to agricultural pesticide

PUBLICATION-DATE: October 5, 2006

## INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Kaku; Koichiro	Shizuoka		JP
Watanabe; Satoshi	Shizuoka		JP
Kawai; Kiyoshi	Shizuoka		JP
Shimizu; Tsutomu	Shizuoka		JP
Nagayama; Kozo	Shizuoka		JP

US-CL-CURRENT: [435/32](#); [435/190](#), [435/254.1](#), [435/484](#), [435/69.1](#), [536/23.2](#)[Full](#) [Title](#) [Citation](#) [Front](#) [Review](#) [Classification](#) [Date](#) [Reference](#) [Sequences](#) [Attachments](#) [Claims](#) [KIMC](#) [Draw Desc](#) [Image](#)

3. Document ID: US 20050118665 A1

L1: Entry 3 of 6

File: PGPB

Jun 2, 2005

PGPUB-DOCUMENT-NUMBER: 20050118665

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20050118665 A1

TITLE: Methods for conducting assays for enzyme activity on protein microarrays

PUBLICATION-DATE: June 2, 2005

## INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY
Zhou, Fang X.	New Haven	CT	US
Schweitzer, Barry	Cheshire	CT	US

US-CL-CURRENT: 435/23; 435/6

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KIMC	Draw. Desc	Image
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 4. Document ID: US 5837505 A

L1: Entry 4 of 6

File: USPT

Nov 17, 1998

US-PAT-NO: 5837505

DOCUMENT-IDENTIFIER: US 5837505 A

TITLE: Melanin production from transformed escherichia coli

DATE-ISSUED: November 17, 1998

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
della-Cioppa; Guy	Vacaville	CA		
Garger, Jr.; Stephen J.	Vacaville	CA		
Sverlow; Genadie G.	Vacaville	CA		
Turpen; Thomas H.	Vacaville	CA		
Grill; Laurence K.	Vacaville	CA		
Chedekal; Miles R.	Vacaville	CA		

US-CL-CURRENT: 435/128; 435/193, 435/244, 435/252.33, 536/23.2, 536/23.4

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KIMC	Draw. Desc	Image
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 5. Document ID: US 5814495 A

L1: Entry 5 of 6

File: USPT

Sep 29, 1998

US-PAT-NO: 5814495

DOCUMENT-IDENTIFIER: US 5814495 A

TITLE: Melanin production by streptomyces

## Record List Display

DATE-ISSUED: September 29, 1998

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
della-Cioppa; Guy	Vacaville	CA		
Garger, Jr.; Stephen J.	Vacaville	CA		
Sverlow; Genadie G.	Vacaville	CA		
Turpen; Thomas H.	Vacaville	CA		
Grill; Laurence K.	Vacaville	CA		
Chedekal; Miles R.	Vacaville	CA		

US-CL-CURRENT: 435/120; 424/60, 435/191, 435/252.35, 435/253.5
[Full](#) | [Title](#) | [Citation](#) | [Front](#) | [Review](#) | [Classification](#) | [Date](#) | [Reference](#) | [Search](#) | [Print](#) | [Claims](#) | [KMC](#) | [Draw. Desc](#) | [Image](#)
 6. Document ID: US 5631151 A

L1: Entry 6 of 6

File: USPT

May 20, 1997

US-PAT-NO: 5631151

DOCUMENT-IDENTIFIER: US 5631151 A

TITLE: Melanin production by transformed organisms

DATE-ISSUED: May 20, 1997

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
della-Cioppa; Guy	Vacaville	CA		
Garger, Jr.; Stephen J.	Vacaville	CA		
Sverlow; Genadie G.	Vacaville	CA		
Turpen; Thomas H.	Vacaville	CA		
Grill; Laurence K.	Vacaville	CA		
Chedekel; Miles R.	Orland	CA		
Kumagai; Monto H.	Davis	CA		

US-CL-CURRENT: 435/133; 435/108, 435/189, 536/23.2
[Full](#) | [Title](#) | [Citation](#) | [Front](#) | [Review](#) | [Classification](#) | [Date](#) | [Reference](#) | [Search](#) | [Print](#) | [Claims](#) | [KMC](#) | [Draw. Desc](#) | [Image](#)
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Terms

Documents

scytalon\$4 same dehydratas\$4

6

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(FILE 'HOME' ENTERED AT 12:51:03 ON 24 JAN 2007)

INDEX 'ADISCTI, ADISINSIGHT, ADISNEWS, AGRICOLA, ANABSTR, ANTE, AQUALINE,  
AQUASCI, BIOENG, BIOSIS, BIOTECHABS, BIOTECHDS, BIOTECHNO, CABA, CAPLUS,  
CEABA-VTB, CIN, CONFSCI, CROPB, CROPU, DDFB, DDFU, DGENE, DISSABS, DRUGB,  
DRUGMONOG2, DRUGU, EMBAL, EMBASE, ...' ENTERED AT 12:57:30 ON 24 JAN 2007  
SEA SCYTALO?(S)DEHYDRATAS?

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12 FILE AGRICOLA  
1 FILE ANABSTR  
12 FILE BIOENG  
59 FILE BIOSIS  
2 FILE BIOTECHABS  
2 FILE BIOTECHDS  
21 FILE BIOTECHNO  
36 FILE CABA  
72 FILE CAPLUS  
17 FILE CROPU  
2 FILE DISSABS  
34 FILE EMBASE  
41 FILE ESBIOBASE  
55 FILE GENBANK  
1 FILE IFIPAT  
8 FILE JICST-EPLUS  
29 FILE LIFESCI  
37 FILE MEDLINE  
24 FILE PASCAL  
75 FILE SCISEARCH  
20 FILE TOXCENTER  
6 FILE USPATFULL

L1 QUE SCYTALO?(S) DEHYDRATAS?

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D RANK

FILE 'SCISEARCH, CAPLUS, BIOSIS, GENBANK, ESBIOBASE, MEDLINE, CABA,  
EMBASE, LIFESCI, PASCAL' ENTERED AT 12:58:33 ON 24 JAN 2007

L2 462 SEA SCYTALO?(S) DEHYDRATAS?  
L3 120 SEA L2(S) RICE?  
L4 99 SEA L3(S)(INHIBIT? OR CARPROP?)  
L5 63 SEA L2(S)(INHIBIT OR CARPROP? OR ANTAGON?)  
L6 21 DUP REM L5 (42 DUPLICATES REMOVED)  
D TI L6 1-21  
D IBIB ABS L6 1-21

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FILE 'DRUGMONOG' ACCESS NOT AUTHORIZED  
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2.31	2.31

INDEX 'ADISCTI, ADISINSIGHT, ADISNEWS, AGRICOLA, ANABSTR, ANTE, AQUALINE,  
AQUASCI, BIOENG, BIOSIS, BIOTECHABS, BIOTECHDS, BIOTECHNO, CABA, CAPLUS,  
CEABA-VTB, CIN, CONFSCI, CROPB, CROPU, DDFB, DDFU, DGENE, DISSABS, DRUGB,  
DRUGMONOG2, DRUGU, EMBAL, EMBASE, ...' ENTERED AT 12:57:30 ON 24 JAN 2007

71 FILES IN THE FILE LIST IN STNINDEX

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=> s scytalo?(s)dehydratas?

12	FILE AGRICOLA
1	FILE ANABSTR
12	FILE BIOENG
59	FILE BIOSIS
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75	FILE SCISEARCH
20	FILE TOXCENTER
6	FILE USPATFULL

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22 FILES HAVE ONE OR MORE ANSWERS, 71 FILES SEARCHED IN STNINDEX

L1 QUE SCYTALO?(S) DEHYDRATAS?

=> d rank

F1	75	SCISEARCH
F2	72	CAPLUS
F3	59	BIOSIS
F4	55	GENBANK
F5	41	ESBIOBASE
F6	37	MEDLINE
F7	36	CABA
F8	34	EMBASE
F9	29	LIFESCI
F10	24	PASCAL
F11	21	BIOTECHNO
F12	20	TOXCENTER
F13	17	CROPU

F14 12 AGRICOLA  
F15 12 BIOENG  
F16 8 JICST-EPLUS  
F17 6 USPATFULL  
F18 2 BIOTECHABS  
F19 2 BIOTECHDS  
F20 2 DISSABS  
F21 1 ANABSTR  
F22 1 IFIPAT

=> file f1-f10  
COST IN U.S. DOLLARS  
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SINCE FILE ENTRY	TOTAL SESSION
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=> s scytalo?(s)dehydratas?  
L2 462 SCYTALO?(S) DEHYDRATAS?

=> s l2(s)rice?  
L3 120 L2(S) RICE?

=> s l3(s)(inhibit? or carprop?)  
L4 99 L3(S) (INHIBIT? OR CARPROP?)

=> s l2(s)(inhibit or carprop? or antagon?)  
L5 63 L2(S) (INHIBIT OR CARPROP? OR ANTAGON?)

=> dup rem 15  
DUPLICATE IS NOT AVAILABLE IN 'GENBANK'.  
ANSWERS FROM THESE FILES WILL BE CONSIDERED UNIQUE

PROCESSING COMPLETED FOR L5

L6 21 DUP REM L5 (42 DUPLICATES REMOVED)

=> d ti 16 1-21

- L6 ANSWER 1 OF 21 CABA COPYRIGHT 2007 CABI on STN  
TI Application of a PCR-luminex system for molecular diagnosis of Magnaporthe grisea isolates resistant to dehydratase inhibitors in melanin biosynthesis (MBI-D).
- L6 ANSWER 2 OF 21 SCISEARCH COPYRIGHT (c) 2007 The Thomson Corporation on STN DUPLICATE 1  
TI Mechanism of resistance to carpropamid in Magnaporthe grisea
- L6 ANSWER 3 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 2  
TI Monitoring and characterization of Magnaporthe grisea isolates with decreased sensitivity to scytalone dehydratase inhibitors
- L6 ANSWER 4 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 3  
TI Enzymatic characterization of scytalone dehydratase Val175Met variant found in melanin biosynthesis dehydratase inhibitor (MBI-D) resistant strains of the rice blast fungus
- L6 ANSWER 5 OF 21 CABA COPYRIGHT 2007 CABI on STN  
TI Efficacy of carpropamid against mutants of Magnaporthe grisea at codon 75 on scytalone dehydratase.
- L6 ANSWER 6 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN  
TI Mode of action of nonfungicidal anti-blast chemicals
- L6 ANSWER 7 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN  
TI Diagnosis of dehydratase inhibitors in melanin biosynthesis inhibitor (MBI-D) resistance by primer-introduced restriction enzyme analysis in scytalone dehydratase gene of Magnaporthe grisea
- L6 ANSWER 8 OF 21 Elsevier BIOBASE COPYRIGHT 2007 Elsevier Science B.V. on STN DUPLICATE  
TI Inhibitors and genetic analysis of scytalone dehydratase confirm the presence of DHN-melanin pathway in sapstain fungi
- L6 ANSWER 9 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN  
TI Design of scytalone dehydratase-inhibiting rice blast fungicides
- L6 ANSWER 10 OF 21 SCISEARCH COPYRIGHT (c) 2007 The Thomson Corporation on STN DUPLICATE 5  
TI Differential inhibition of a melanin biosynthetic enzyme scytalone dehydratase by carpropamid, a fungicide for rice blast control, and its isomers
- L6 ANSWER 11 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN  
TI Structural and functional analysis of scytalone dehydratase required for pathogenicity of the rice blast fungus
- L6 ANSWER 12 OF 21 CABA COPYRIGHT 2007 CABI on STN  
TI Efficient target-site assay of chemicals for melanin biosynthesis inhibition of Magnaporthe grisea.
- L6 ANSWER 13 OF 21 CABA COPYRIGHT 2007 CABI on STN  
TI Molecular action mechanism of a new melanin biosynthesis inhibitor.
- L6 ANSWER 14 OF 21 CABA COPYRIGHT 2007 CABI on STN  
TI Molecular action mechanism of nonfungicidal anti-blast chemicals.
- L6 ANSWER 15 OF 21 SCISEARCH COPYRIGHT (c) 2007 The Thomson Corporation on STN DUPLICATE 6

TI Cryogenic X-ray crystal structure analysis for the complex of scytalone dehydratase of a rice blast fungus and its tight-binding inhibitor, carpropamid: The structural basis of tight-binding inhibition

L6 ANSWER 16 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 7  
TI Carpropamid. A rice fungicide with two modes of action

L6 ANSWER 17 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 8  
TI Carpropamid. A new melanin biosynthesis inhibitor

L6 ANSWER 18 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 9  
TI Molecular action mechanism of nonfungicidal anti-blast chemicals

L6 ANSWER 19 OF 21 SCISEARCH COPYRIGHT (c) 2007 The Thomson Corporation on STN DUPLICATE 10  
TI Inhibition of scytalone dehydratase in melanin biosynthesis by carpropamid, a novel rice blast controlling agent

L6 ANSWER 20 OF 21 SCISEARCH COPYRIGHT (c) 2007 The Thomson Corporation on STN DUPLICATE 11  
TI Carpropamid, an anti-rice blast fungicide, inhibits scytalone dehydratase activity and appressorial penetration in *Colletotrichum lagenarium*

L6 ANSWER 21 OF 21 CABA COPYRIGHT 2007 CABI on STN  
TI The inhibition of melanin biosynthetic reactions in *Pyricularia oryzae* by compounds that prevent rice blast disease.

=> d ibib abs 16 1-21

L6 ANSWER 1 OF 21 CABA COPYRIGHT 2007 CABI on STN  
ACCESSION NUMBER: 2006:63722 CABA  
DOCUMENT NUMBER: 20063037076  
TITLE: Application of a PCR-luminex system for molecular diagnosis of *Magnaporthe grisea* isolates resistant to dehydratase inhibitors in melanin biosynthesis (MBI-D)  
AUTHOR: Ishii, H.; Tanoue, J.; Oshima, M.; Yamaguchi, J.; Nemoto, F.; So, K.; Dehne, H. W. [EDITOR]; Gisi, U. [EDITOR]; Kuck, K. H. [EDITOR]; Russell, P. E. [EDITOR]; Lyr, H. [EDITOR]  
CORPORATE SOURCE: National Institute for Agro-Environmental Sciences, Tsukuba, Ibaraki 305-8604, Japan.  
SOURCE: Modern fungicides and antifungal compounds IV: 14th International Reinhardtsbrunn Symposium, Friedrichroda, Thuringia, Germany, April 25-29, 2004, (2005) pp. 31-34. 5 ref.  
Publisher: British Crop Protection Council. Alton  
Price: Book chapter; Conference paper  
Meeting Info.: Modern fungicides and antifungal compounds IV: 14th International Reinhardtsbrunn Symposium, Friedrichroda, Thuringia, Germany, April 25-29, 2004.  
ISBN: 1-901396-39-8  
PUB. COUNTRY: United Kingdom  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
ENTRY DATE: Entered STN: 5 Apr 2006  
Last Updated on STN: 5 Apr 2006  
AB The total DNA of two *M. grisea* isolates resistant to carpropamid and two wild-type isolates of the fungus were extracted and served as template in PCR. After sequencing PCR products and digestion with a

restriction enzyme, it was confirmed that in resistant isolates, nucleotide changes from GTG (valine) to ATG (methionine) occurred at position 75 of the fungicide-targeted enzyme. A designed biotin-labelled reverse primer was used with a forward primer to amplify a fragment of the scytalone dehydratase gene. Biotinylated PCR-amplified product was hybridized to the oligonucleotide probes covalently coupled to fluorescent beads, and reactions were analysed on the Luminex 100 System. The two wild-type and two resistant isolates were successfully distinguished from each other based on the signal intensity of hybridization of specific oligonucleotide probes with their corresponding PCR products, which carried complementary nucleotide sequences. The results show that PCR-Luminex system is suitable for a high-throughput analysis of single nucleotide polymorphisms, and will thus be useful for comprehensive diagnosis of other point mutation-based fungicide resistance (e.g. benzimidazole and strobilurin resistance in plant pathogens).

L6 ANSWER 2 OF 21 SCISEARCH COPYRIGHT (c) 2007 The Thomson Corporation on STN DUPLICATE 1

ACCESSION NUMBER: 2004:809287 SCISEARCH

THE GENUINE ARTICLE: 849LE

TITLE: Mechanism of resistance to carpropamid in Magnaporthe grisea

AUTHOR: Takagaki M (Reprint); Kaku K; Watanabe S; Kawai K; Shimizu T; Sawada H; Kumakura K; Nagayama K

CORPORATE SOURCE: Kumiai Chem Ind Co Ltd, Life Sci Res Inst, 3360 Kamo, Shizuoka 4390031, Japan (Reprint); Kumiai Chem Ind Co Ltd, Life Sci Res Inst, Shizuoka 4390031, Japan; Bayer CropSci KK, Yuki Res Ctr, Ibaraki 3070001, Japan  
m-takagaki@kumiai-chem.co.jp

COUNTRY OF AUTHOR: Japan

SOURCE: PEST MANAGEMENT SCIENCE, (SEP 2004) Vol. 60, No. 9, pp. 921-926.

ISSN: 1526-498X.

PUBLISHER: JOHN WILEY & SONS LTD, THE ATRIUM, SOUTHERN GATE, CHICHESTER PO19 8SQ, W SUSSEX, ENGLAND.

DOCUMENT TYPE: Article; Journal

LANGUAGE: English

REFERENCE COUNT: 28

ENTRY DATE: Entered STN: 2 Oct 2004

Last Updated on STN: 2 Oct 2004

\*ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS\*

AB The inhibitory activity of carpropamid on scytalone dehydratase (SDH) extracted from a carpropamid-resistant strain of Magnaporthe grisea (Hebert) Barr was dramatically reduced in comparison with that on SDH extracted from the sensitive strain. A single-point mutation (G to A) located at the upstream region (233 bp downstream from the ATG codon) resulting in a one-amino-acid substitution (valine [GTG] 75 to methionine [ATG]: V75M) was found in the resistant strain. To examine whether the V75M mutation is the primary reason for decreasing the sensitivity of SDH to carpropamid, the SDH cDNAs of both the sensitive and the resistant strain were cloned into a GST-fused protein expression vector-system. The recombinant SDHs of both strains exhibited the same sensitivities to carpropamid as those extracted from the mycelia of the respective strains. These data clearly revealed that the V75M mutation causes the low sensitivities of the SDHs of the carpropamid-resistant strains, and strongly suggests that the V75M mutation confers resistance of these strains to carpropamid. (C) 2004 Society of Chemical Industry.

L6 ANSWER 3 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 2

ACCESSION NUMBER: 2004:636864 CAPLUS

DOCUMENT NUMBER: 141:345010

TITLE: Monitoring and characterization of Magnaporthe grisea isolates with decreased sensitivity to scytalone dehydratase inhibitors

AUTHOR(S) : Sawada, Haruko; Sugihara, Minoru; Takagaki, Makiichi;  
Nagayama, Kozo  
CORPORATE SOURCE: Bayer CropScience KK Yuki Research Centre, Yuki,  
307-0001, Japan  
SOURCE: Pest Management Science (2004), 60(8), 777-785  
CODEN: PMSCFC; ISSN: 1526-498X  
PUBLISHER: John Wiley & Sons Ltd.  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB Rice blast fungus isolates were collected in Kyushu to investigate resistance to scytalone dehydratase inhibitors of melanin biosynthesis (MBI-D). In 2001, failure of control of rice blast was reported in the Saga prefecture, where MBI-Ds have been used since 1998. At that time, the distribution of resistant isolates was mainly limited to that area. However, in 2002, resistant isolates were detected in all prefectures of Kyushu. DNA fingerprinting anal. showed that the mutation causing resistance to MBI-Ds had arisen independently in each area. These data suggest that resistant isolates may occur in any area and become dominant under continuous selection pressure for MBI-Ds. Nevertheless, resistant strains can be controlled by reductase inhibitors of melanin biosynthesis (MBI-R) or com. rice seed disinfectants.

REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 4 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 3  
ACCESSION NUMBER: 2004:327763 CAPLUS  
DOCUMENT NUMBER: 142:109230  
TITLE: Enzymatic characterization of scytalone dehydratase Val175Met variant found in melanin biosynthesis dehydratase inhibitor (MBI-D) resistant strains of the rice blast fungus  
AUTHOR(S) : Yamada, Naoki; Motoyama, Takayuki; Nakasako, Masayoshi; Kagabu, Shinzo; Kudo, Toshiaki; Yamaguchi, Isamu  
CORPORATE SOURCE: Department of Physics, Faculty of Science and Technology, Keio University, Kanagawa, 223-8522, Japan  
SOURCE: Bioscience, Biotechnology, and Biochemistry (2004), 68(3), 615-621  
CODEN: BBBIEJ; ISSN: 0916-8451  
PUBLISHER: Japan Society for Bioscience, Biotechnology, and Agrochemistry  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB Carpropamid ((1RS,3SR)-2,2-dichloro-N-[(R)-1-(4-chlorophenyl)ethyl]-1-ethyl-3-methylcyclopropanecarboxamide) is a potent chemical against the rice blast fungus, *Pyricularia oryzae*. In 2001, isolates of the fungus with reduced sensitivity to this fungicide appeared in Saga Prefecture of Japan and were regarded as a potential threat to rice protection by carpropamid. The cause of the resistance has been identified genetically as a point mutation resulting in the Val175Met change in scytalone dehydratase, the primary target of the fungicide. We constructed an overexpression system of the variant enzyme and characterized the kinetics in the catalysis and the inhibition by carpropamid isomers. The variant enzyme retained a significant level of enzymic activity. Inhibition of the variant enzyme by carpropamid was more than 200-fold reduced in comparison with that of the wild-type. Based on the results, here we propose possible mechanisms of the carpropamid-resistance of the variant enzyme in retaining the normal enzymic activity.

REFERENCE COUNT: 26 THERE ARE 26 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 5 OF 21 CABAB COPYRIGHT 2007 CABI on STN  
ACCESSION NUMBER: 2004:187880 CABAB  
DOCUMENT NUMBER: 20043174916  
TITLE: Efficacy of carpropamid against mutants of

AUTHOR: Magnaporthe grisea at codon 75 on scytalone dehydratase  
Shigyo, T.; Kuchii, Y.; Araki, Y.; Sawada, H.;  
Kawasaki, S. [EDITOR]

CORPORATE SOURCE: Nihon Bayer Agrochem K.K., Yuki Research Center,  
9511-4, Yuki, Yuki City, Ibaraki 307-0001, Japan.  
takuma.shigyo@bayercropscience.com

SOURCE: Rice blast: interaction with rice and control.  
Proceedings of the 3rd International Rice Blast Conference, Tsukuba Science City, Ibaraki, Japan, 11 to 14 September 2002, (2004) pp. 281-287. 10 ref.  
Publisher: Kluwer Academic Publishers. Dordrecht  
Price: Book chapter; Conference paper  
Meeting Info.: Rice blast: interaction with rice and control. Proceedings of the 3rd International Rice Blast Conference, Tsukuba Science City, Ibaraki, Japan, 11 to 14 September 2002.  
ISBN: 1-4020-1228-4

PUB. COUNTRY: Netherlands Antilles

DOCUMENT TYPE: Journal

LANGUAGE: English

ENTRY DATE: Entered STN: 3 Dec 2004  
Last Updated on STN: 3 Dec 2004

AB In 2001, Pyricularia oryzae (Magnaporthe grisea) isolates, showing reduced sensitivity to scytalone dehydratase inhibitors, were collected from the Matsuura river area in Saga prefecture, Japan. A single-point mutation causing substitution of one amino acid in scytalone dehydratase was found in those isolates. However, the blast control efficacy of carpropamid in the field has not been completely lost in the area where the mutant isolate is dominant. The results of inoculation tests suggest that enhancement of host defence responses, the other mode-of-action of carpropamid, may contribute to the residual efficacy of carpropamid against the mutants.

L6 ANSWER 6 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN  
ACCESSION NUMBER: 2004:655208 CAPLUS

TITLE: Mode of action of nonfungicidal anti-blast chemicals

AUTHOR(S): Yamaguchi, Isamu

CORPORATE SOURCE: Environmental Plant Research Group, RIKEN Plant Science Center, Tsurumi, Yokohama, 230-0045, Japan

SOURCE: Abstracts of Papers, 228th ACS National Meeting, Philadelphia, PA, United States, August 22-26, 2004 (2004), AGRO-014. American Chemical Society:  
Washington, D. C.

CODEN: 69FTZ8

DOCUMENT TYPE: Conference; Meeting Abstract

LANGUAGE: English

AB While all modern pesticides are developed through extensive safety evaluation, there is a growing public concern about their effects on non-target organisms and the environment. Thus, there is a great deal of renewed interest in nonfungicidal disease controlling agents that are inherently specific to target plant pathogens. Two groups of nonfungicidal chems. of rice blast, a serious rice disease in Japan, are available; melanin biosynthesis inhibitors (MBI and MBI-D) and plant activators or priming effectors, which induce host resistance against the pathogen's attack. Carpropamid, a novel MBI-D, inhibits scytalone dehydratase in the melanin biosynthesis pathway of Magnaporthe grisea, and probenazole induces systemic acquired resistance (SAR) in plants against M. No resistant pathogenic strains have emerged against probenazole in spite of its three decade use. Both chemical groups have high efficacy but low toxicity to non-target organisms. The mol. action and future prospects for related compds. will be discussed.

L6 ANSWER 7 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN  
ACCESSION NUMBER: 2003:599065 CAPLUS  
DOCUMENT NUMBER: 139:255905  
TITLE: Diagnosis of dehydratase inhibitors in melanin biosynthesis inhibitor (MBI-D) resistance by primer-introduced restriction enzyme analysis in scytalone dehydratase gene of *Magnaporthe grisea*  
AUTHOR(S): Kaku, Koichiro; Takagaki, Makiochi; Shimizu, Tsutomu; Nagayama, Kozo  
CORPORATE SOURCE: Life Science Research Institute, Kumai Chemical Industry Co Ltd, Kikugawa, 439-0031, Japan  
SOURCE: Pest Management Science (2003), 59(8), 843-846  
CODEN: PMSCFC; ISSN: 1526-498X  
PUBLISHER: John Wiley & Sons Ltd.  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB We have established a simple diagnosis method for rice blast fungus resistant to MBI-D. This involves the preparation of PCR templates directly from the lesions in combination with primer-introduced restriction enzyme anal. PCR (PIRA-PCR).  
REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 8 OF 21 Elsevier BIOBASE COPYRIGHT 2007 Elsevier Science B.V. on STN  
DUPLICATE  
ACCESSION NUMBER: 2003002355 ESBIOBASE  
TITLE: Inhibitors and genetic analysis of scytalone dehydratase confirm the presence of DHN-melanin pathway in sapstain fungi  
AUTHOR: Fleet C.; Breuil C.  
CORPORATE SOURCE: C. Fleet, Department of Wood Science, University of British Columbia, 4036-2424 Main Mall, Vancouver, B.C. V6T 1Z4, Canada.  
E-mail: breuil@interchange.ubc.ca  
SOURCE: Mycological Research, (01 NOV 2002), 106/11 (1331-1339), 41 reference(s)  
CODEN: MYCRER ISSN: 0953-7562  
DOCUMENT TYPE: Journal; Article  
COUNTRY: United Kingdom  
LANGUAGE: English  
SUMMARY LANGUAGE: English  
AB The presence of the 1,8-dihydroxynaphthalene (DHN) melanin biosynthesis pathway was demonstrated in several sapstain fungi including *Ceratocystis* and *Ophiostoma*, using both chemical inhibitors and molecular techniques. The inhibitor compounds tricyclazole and carpropamid effectively reduced pigmentation at low concentrations in all tested fungal species, but also lead to growth inhibition at higher concentrations. The inhibitor cerulenin prevented fungal growth in all tested fungi at all tested concentrations, likely due to its inhibitory effect on another enzyme, the metabolically critical fatty acid synthase. Partial DNA sequences for the gene encoding scytalone dehydratase (SD) were obtained from species of *Ceratocystis* and *Ophiostoma* and found to have homology with known respective DHN-SD gene sequences. Sequence analysis of the partial SD amino acid sequences showed greater than 80% similarity among the sapstain species, and corresponded well with known phylogenies of sapstain fungi based on rDNA sequences. Aside from the work carried out on the isolate *O. floccosum* 387N, this is the first known documentation of the melanin pigmentation pathway used by species of the sapstain fungi *Ceratocystis*, *Leptographium* and *Ophiostoma*. Furthermore, since no fungus has ever been found, to our knowledge, to have more than one melanin synthesis pathway, we can state that these species are likely only to use the DHN pathway for melanin production.

ACCESSION NUMBER: 2001:915262 CAPLUS  
DOCUMENT NUMBER: 136:162653  
TITLE: Design of scytalone dehydratase-inhibiting rice blast fungicides  
AUTHOR(S): Basarab, Gregory S.; Jordan, Douglas B.; Gehret, Troy C.; Schwartz, Rand S.; Bonman, J. Michael; Smith, G. Shawn  
CORPORATE SOURCE: Experimental Station, Central Research and Development, E. I. Du Pont de Nemours and Co., Wilmington, DE, 19880, USA  
SOURCE: ACS Symposium Series (2002), 800 (Synthesis and Chemistry of Agrochemicals VI), 278-291  
CODEN: ACSMC8; ISSN: 0097-6156  
PUBLISHER: American Chemical Society  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB By targeting the enzyme scytalone dehydratase for inhibitor design, a series of highly efficacious rice blast fungicides were identified. Evaluation for disease control in a series of greenhouse and field assays led to the discovery of an exceptionally potent trifluoro-substituted cyanoacetamide. Key to the design effort was the recognition that the lipophilicity of the chemical was generally directly related to inhibitory potency but indirectly related to greenhouse efficacy. The incorporation of fluorine atoms during the design program afforded potent inhibitors and optimized phys.-chemical properties important for bioavailability and superior control of rice blast disease.

REFERENCE COUNT: 27 THERE ARE 27 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 10 OF 21 SCISEARCH COPYRIGHT (c) 2007 The Thomson Corporation on STN DUPLICATE 5  
ACCESSION NUMBER: 2002:462592 SCISEARCH  
THE GENUINE ARTICLE: 556TE  
TITLE: Differential inhibition of a melanin biosynthetic enzyme scytalone dehydratase by carpropamid, a fungicide for rice blast control, and its isomers  
AUTHOR: Motoyama T; Kagabu S; Matsuoka M; Yamaguchi I (Reprint)  
CORPORATE SOURCE: RIKEN, Inst Phys & Chem Res, Wako, Saitama 3510198, Japan (Reprint); RIKEN, Plant Sci Ctr, Wako, Saitama 3510198, Japan; Gifu Univ, Fac Educ, Dept Chem, Gifu 5011193, Japan  
COUNTRY OF AUTHOR: Japan  
SOURCE: JOURNAL OF PESTICIDE SCIENCE, (2002) Vol. 27, No. 2, pp. 141-144.  
ISSN: 0385-1559.  
PUBLISHER: PESTICIDE SCI SOC JAPAN, TOKYO UNIV AGR DEPT OF AGR CHEM, TOKYO, 156, JAPAN.  
DOCUMENT TYPE: Article; Journal  
LANGUAGE: English  
REFERENCE COUNT: 10  
ENTRY DATE: Entered STN: 14 Jun 2002  
Last Updated on STN: 14 Jun 2002

L6 ANSWER 11 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN  
ACCESSION NUMBER: 2001:793270 CAPLUS  
DOCUMENT NUMBER: 136:98203  
TITLE: Structural and functional analysis of scytalone dehydratase required for pathogenicity of the rice blast fungus  
AUTHOR(S): Motoyama, Takayuki  
CORPORATE SOURCE: RIKEN Institute, Wako, 351-0198, Japan  
SOURCE: Nippon Noyaku Gakkaishi (2001), 26(3), 287-291  
CODEN: NNGADV; ISSN: 0385-1559  
PUBLISHER: Nippon Noyaku Gakkai  
DOCUMENT TYPE: Journal; General Review

LANGUAGE:

Japanese

AB A review, on use of carpropamid, a tight-binding competitive inhibitor, of scytalone dehydratase (STD) in anal. of STD inhibitory mechanism and tertiary structural and functional anal. of STD.

L6 ANSWER 12 OF 21 CABA COPYRIGHT 2007 CABI on STN

ACCESSION NUMBER: 2000:149723 CABA

DOCUMENT NUMBER: 20001008591

TITLE: Efficient target-site assay of chemicals for melanin biosynthesis inhibition of *Magnaporthe grisea*

AUTHOR: Kim JinCheol; Son MiJung; Kim HeungTae; Choi GyoungJa; Hahn HohGyu; Nam KeeDal; Cho KwangYun; Kim, J. C.; Son, M. J.; Kim, H. T.; Choi, G. J.; Hahn, H. G.; Nam, K. D.; Cho, K. Y.

CORPORATE SOURCE: Screening Division, Korea Research Institute of Chemical Technology, P.O. Box 107, Yusong, Taejon 305-600, Korea Republic.

SOURCE: Plant Pathology Journal, (2000) Vol. 16, No. 3, pp. 125-129. 16 ref.

DOCUMENT TYPE: Journal

LANGUAGE: English

ENTRY DATE: Entered STN: 8 Dec 2000

Last Updated on STN: 8 Dec 2000

AB A rapid and efficient assay to determine melanin biosynthesis inhibition of *Magnaporthe grisea*, a causal agent of the rice blast, by chemicals was developed. Wells in 24-well plates were loaded with spore suspension of the fungus and three known melanin biosynthesis inhibitors of KC10017, tricyclazole, and carpropamid. Subsequent color changes of mycelia and culture media in the wells were observed 7 days after incubation. The wells treated with KC10017 (an inhibitor of polyketide synthesis step and/or pentaketide cyclization step) became colourless, whereas tricyclazole (an inhibitor of 1,3,8-trihydroxynaphthalene reductase) or carpropamid (an inhibitor of scytalone dehydratase)-treated wells exhibited red color. They did not show any inhibitory effect on fungal growth. The inhibition of reaction steps prior to 1,3,6,8-tetrahydroxynaphthalene formation was easily determined by colourless medium and mycelia. However, it was impossible to distinguish between inhibition of reduction steps and inhibition of dehydration steps by colors of the cultures. It was accomplished through HPLC analysis of the melanin biosynthesis-involving pentaketide metabolites accumulated by the inhibitors. Through screening of a number of synthetic chemicals using the in vitro assay, we could find a novel chemical group of melanin biosynthesis inhibitor.

L6 ANSWER 13 OF 21 CABA COPYRIGHT 2007 CABI on STN

ACCESSION NUMBER: 1999:107672 CABA

DOCUMENT NUMBER: 19991004383

TITLE: Molecular action mechanism of a new melanin biosynthesis inhibitor

AUTHOR: Motoyama, T.; Nakasako, M.; Yamaguchi, I.; Lyr, H. [EDITOR]; Russell, P. E. [EDITOR]; Dehne, H.-W. [EDITOR]; Sisler, H. D. [EDITOR]

CORPORATE SOURCE: Institute of Physical and Chemical Research (RIKEN), 2-1 Hirosawa, Wako, Saitama 351-0198, Japan.

SOURCE: Modern fungicides and antifungal compounds II. 12th International Reinhardtsbrunn Symposium, Friedrichroda, Thuringia, Germany, 24th-29th May 1998, (1999) pp. 111-119. 13 ref.

Publisher: Intercept Limited. Andover

Price: Conference paper; Book chapter

Meeting Info.: Modern fungicides and antifungal compounds II. 12th International Reinhardtsbrunn Symposium, Friedrichroda, Thuringia, Germany, 24th-29th May 1998.

ISBN: 1-898298-60-2  
PUB. COUNTRY: United Kingdom  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
ENTRY DATE: Entered STN: 11 Aug 1999  
Last Updated on STN: 11 Aug 1999

AB Carpropamid ((1RS, 3SR)-2,2-dichloro-N-[1-(4-chlorophenyl)ethyl]-1-ethyl-3-methylcyclopropanecarboxamide) was recently developed as a potent controlling agent against rice blast disease caused by Pyricularia oryzae (teleomorph: Magnaporthe grisea). Physiological studies suggested that this non-fungicidal compound specifically inhibits scytalone dehydratase (SDH) in the melanin biosynthetic pathway of P. oryzae. Molecular action mechanism of carpropamid was studied by enzyme kinetics and X-ray crystallography with use of a recombinant SDH. SDH was purified from P. oryzae and its cDNA was cloned on the basis of its amino acid sequence. Then, a T7 phage promoter-based overexpression system was constructed in E. coli. The recombinant SDH produced in E. coli exerted specific activity identical to the dehydratase in P. oryzae and used for further studies. Inhibition of SDH by carpropamid was observed at very low concentrations of the inhibitor close to the enzyme concentration. This result suggests that carpropamid is a tight-binding inhibitor of SDH. Thus, the inhibition type and the dissociation constant (Ki) was determined for carpropamid by fitting the enzymatic activity data to the specific equations developed for tight-binding inhibitors. The apparent dissociation constants (Kiapp) showed a closely linear dependence on the concentration of substrate, suggesting that the predominant type of inhibition of SDH by carpropamid is competitive. The calculated Ki value was 140 pM, which is approximately 2 x 10<sup>5</sup> times smaller than the Km for scytalone and is much smaller than the Ki values of the other MBI reported so far. Based on these results, it is concluded that carpropamid directly and specifically inhibits SDH. Interactions which determine this tight binding were revealed by an X-ray crystallographic study. In particular, 3 hydrogen bonds and interactions among aromatic rings are considered to be important. Some amino acid residues involved in the inhibitor binding were exchanged for other amino acids by site-directed mutagenesis and the effects on enzyme activity and inhibitor binding were analysed. Through the study, an interesting function of a C-terminal region of SDH was proposed.

L6 ANSWER 14 OF 21 CABO COPYRIGHT 2007 CABI on STN  
ACCESSION NUMBER: 1999:4224 CABO  
DOCUMENT NUMBER: 19981009354  
TITLE: Molecular action mechanism of nonfungicidal anti-blast chemicals  
AUTHOR: Yamaguchi, I.; Motoyama, T.; Nakasako, M.; Kuhr, R. J. [EDITOR]; Motoyama, N. [EDITOR]  
CORPORATE SOURCE: Institute of Physical and Chemical Research (RIKEN), 2-1 Hirosawa, Wako, Saitama 351-01, Japan.  
SOURCE: Pesticides and the future: minimizing chronic exposure of humans and the environment, (1998) pp. 225-230. 7 ref.  
Publisher: IOS Press. Amsterdam  
ISBN: 90-5199-388-9  
PUB. COUNTRY: Netherlands Antilles  
DOCUMENT TYPE: Miscellaneous  
LANGUAGE: English  
ENTRY DATE: Entered STN: 12 Jan 1999  
Last Updated on STN: 12 Jan 1999

AB When scytalone was treated with a crude cell-free extract of the P2 strain of Pyricularia oryzae [Magnaporthe grisea], products formed appear to include 1,3,8-trihydroxynaphthalene (T3HN), the dehydration product of scytalone, and an autooxidation analog of T3HN. The appearance of both products was inhibited by carpropamid, suggesting that carpropamid can inhibit dehydration of

scytalone without affecting the formation of scytalone dehydratase (SDH) itself in *M. grisea*. Recombinant studies with *E. coli* indicated that carpropamid directly and specifically inhibits SDH.

L6 ANSWER 15 OF 21 SCISEARCH COPYRIGHT (c) 2007 The Thomson Corporation on STN DUPLICATE 6

ACCESSION NUMBER: 1998:547868 SCISEARCH

THE GENUINE ARTICLE: 101XQ

TITLE: Cryogenic X-ray crystal structure analysis for the complex of scytalone dehydratase of a rice blast fungus and its tight-binding inhibitor, carpropamid: The structural basis of tight-binding inhibition

AUTHOR: Nakasako M; Motoyama T; Kurahashi Y; Yamaguchi I (Reprint)

CORPORATE SOURCE: RIKEN, Inst Phys & Chem Res, Wako, Saitama 3510198, Japan (Reprint); Japan Sci & Technol Corp, Precursory Res & Embryon Sci & Technol, Tokyo 1130032, Japan; Univ Tokyo, Inst Mol & Cellular Biosci, Bunkyo Ku, Tokyo 1130032, Japan; Nihon Bayer Agrochem KK, Yuki Res Ctr, Ibaraki, Osaka 3070001, Japan

COUNTRY OF AUTHOR: Japan

SOURCE: BIOCHEMISTRY, (14 JUL 1998) Vol. 37, No. 28, pp. 9931-9939

ISSN: 0006-2960.

PUBLISHER: AMER CHEMICAL SOC, 1155 16TH ST, NW, WASHINGTON, DC 20036 USA.

DOCUMENT TYPE: Article; Journal

LANGUAGE: English

REFERENCE COUNT: 25

ENTRY DATE: Entered STN: 1998

Last Updated on STN: 1998

\*ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS\*

AB Scytalone dehydratase is a member of the group of enzymes involved in fungal melanin biosynthesis in a phytopathogenic fungus, *Pyricularia oryzae*, which causes rice blast disease. Carpropamid [(1RS,3SR)-2,2-dichloro-N-[(R)-1-(4-chlorophenyl)ethyl]-1-ethyl-3-methylcyclopropanecarboxamide] is a tight-binding inhibitor of the enzyme. To clarify the structural basis for tight-binding inhibition, the crystal structure of the enzyme complexed with carpropamid was analyzed using diffraction data collected at 100 K. The structural model was refined to a crystallographic R-factor of 0.180 against reflections up to a resolution of 2.1 Angstrom. Carpropamid was bound in a hydrophobic cavity of the enzyme. Three types of interactions appeared to contribute to the binding, (i) A hydrogen bond was formed between a chloride atom in the dichloromethylethylcyclopropane ring of carpropamid and Asn-131 of the enzyme. (ii) The (chlorophenyl)ethyl group of carpropamid built strong contacts with Val-75, and this group further formed a cluster of aromatic rings together with four aromatic residues in the enzyme (Tyr-50, Phe-53, Phe-158, and Phe-162), (iii) Two hydration water molecules bound to the carboxamide group of carpropamid, and they were further hydrogen-bonded to Tyr-30, Tyr-50, His-85, and His-110. As a result of interactions between carpropamid and the phenylalanine residues (Phe-158 and Phe-162) in the C-terminal region of the enzyme, the C-terminal region completely covered the inhibitor, ensuring its localization in the cavity.

L6 ANSWER 16 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 7

ACCESSION NUMBER: 1999:107314 CAPLUS

DOCUMENT NUMBER: 130:149804

TITLE: Carpropamid. A rice fungicide with two modes of action

AUTHOR(S): Thierion, M.; Pontzen, R.; Kurahashi, Yoshio

CORPORATE SOURCE: Inst. Biologie III, RWTH, Aachen, D-52056, Germany

SOURCE: Pflanzenschutz-Nachrichten Bayer (German Edition)

(1998), 51(3), 259-280

CODEN: PNBYAT; ISSN: 0340-1723

PUBLISHER: Bayer AG  
DOCUMENT TYPE: Journal  
LANGUAGE: German  
AB The effects of carpropamid were investigated on the inhibition of melanin biosynthesis, the efficiency of this effect on the interaction between Pyricularia oryzae and rice plants, and the induction of resistance in rice. The inhibition of melanin biosynthesis by carpropamid is abolished by the addition of the melanin precursor 1,8-dihydroxynaphthalene (1,8-DHN). This results in a rise of pigmented appressoria on carpropamid treated rice leaves from 5 to 30% after the addnl. application of 1,8-DHN. These pigmented appressoria regain the capability to penetrate rice cells in the normal way. The penetration frequency rises from 0.5 to 45% without and with 1,8-DHN, resp. Similar results were obtained with the melanin biosynthesis inhibitor fungicide tricyclazole. In the case of tricyclazole the use of the melanin precursors 1,8-DHN and L-DOPA (3,4-dihydrophenylalanin) results in successful colonization of rice plants by the pathogen. After treatment of rice plants with carpropamid and subsequent reversal of its 1st mode of action by 1,8-DHN or L-DOPA fungal development is completely inhibited shortly after penetration. This inhibition correlates with "induced lignification" of infected rice cells and with increased accumulation of the phytoalexins momilactone A and sakuranetin in the infected leaves. Comparative investigations with the resistance inductor DDCC (2,2-dichloro-3,3-dimethylcyclopropane carbonic acid) show that carpropamid induces resistance in rice plants.

REFERENCE COUNT: 28 THERE ARE 28 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 17 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 8  
ACCESSION NUMBER: 1999:107313 CAPLUS  
DOCUMENT NUMBER: 130:149803  
TITLE: Carpropamid. A new melanin biosynthesis inhibitor  
AUTHOR(S): Kurahashi, Y.; Pontzen, R.  
CORPORATE SOURCE: Nihon Bayer Agrochem K. K., Yuki, 307, Japan  
SOURCE: Pflanzenschutz-Nachrichten Bayer (German Edition)  
(1998), 51(3), 247-258  
CODEN: PNBYAT; ISSN: 0340-1723  
PUBLISHER: Bayer AG  
DOCUMENT TYPE: Journal  
LANGUAGE: German  
AB The inhibition of melanin biosynthesis by carpropamid was investigated in cultured Pyricularia oryzae. Carpropamid inhibited scytalone dehydratase which converts scytalone into 1,3,8-trihydroxynaphthalene by elimination of water and the 2nd dehydration step in which vermelone is converted into 1,8-dihydroxynaphthalene. Thus, scytalone and vermelone were accumulated in the culture filtrate of the fungus.

REFERENCE COUNT: 25 THERE ARE 25 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 18 OF 21 CAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 9  
ACCESSION NUMBER: 1998:566655 CAPLUS  
DOCUMENT NUMBER: 129:299187  
TITLE: Molecular action mechanism of nonfungicidal anti-blast chemicals  
AUTHOR(S): Yamaguchi, Isamu; Motoyama, Takayuki; Nakasako, Masayoshi  
CORPORATE SOURCE: The Institute of Physical and Chemical Research (RIKEN), Saitama, 351-01, Japan  
SOURCE: Reviews in Toxicology (Amsterdam) (1998), 2(1-4), 225-230  
CODEN: RETOFJ; ISSN: 1382-6980  
PUBLISHER: IOS Press  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB When scytalone was treated with a crude cell-free extract of the P2 strain of

Pyricularia oryzae, products formed appear to include 1,3,8-trihydroxynaphthalene (T3HN), the dehydration product of scytalone, and an autoxidn. analog of T3HN. The appearance of both products was inhibited by carpropamid, suggesting that carpropamid can inhibit dehydration of scytalone without affecting the formation of scytalone dehydratase (SDH) itself in P. oryzae. Recombinant studies with E. coli indicated that carpropamid directly and specifically inhibits SDH.

REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 19 OF 21 SCISEARCH COPYRIGHT (c) 2007 The Thomson Corporation on STN DUPLICATE 10

ACCESSION NUMBER: 1998:362015 SCISEARCH

THE GENUINE ARTICLE: ZN123

TITLE: Inhibition of scytalone dehydratase in melanin biosynthesis by carpropamid, a novel rice blast controlling agent

AUTHOR: Motoyama T (Reprint); Imanishi K; Kinbara T; Kurahashi Y; Yamaguchi I

CORPORATE SOURCE: RIKEN, Inst Phys & Chem Res, Wako, Saitama 3510198, Japan (Reprint); Nihon Bayer Agrochem Co Ltd, Yuki Res Ctr, Yuki 3070001, Japan

COUNTRY OF AUTHOR: Japan

SOURCE: JOURNAL OF PESTICIDE SCIENCE, (1998) Vol. 23, No. 1, pp. 58-61.

ISSN: 0385-1559.

PUBLISHER: PESTICIDE SCI SOC JAPAN, TOKYO UNIV AGR DEPT OF AGR CHEM, TOKYO, 156, JAPAN.

DOCUMENT TYPE: Article; Journal

LANGUAGE: English

REFERENCE COUNT: 15

ENTRY DATE: Entered STN: 1998  
Last Updated on STN: 1998

L6 ANSWER 20 OF 21 SCISEARCH COPYRIGHT (c) 2007 The Thomson Corporation on STN DUPLICATE 11

ACCESSION NUMBER: 1997:842581 SCISEARCH

THE GENUINE ARTICLE: YF610

TITLE: Carpropamid, an anti-rice blast fungicide, inhibits scytalone dehydratase activity and appressorial penetration in Colletotrichum lagenarium

AUTHOR: Tsuji G (Reprint); Takeda T; Furusawa I; Horino O; Kubo Y

CORPORATE SOURCE: KYOTO UNIV, FAC AGR, PLANT PATHOL LAB, KYOTO 606, JAPAN

COUNTRY OF AUTHOR: JAPAN

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\*ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS\*

AB Biosynthesis of melanin by Colletotrichum lagenarium is essential for appressorial penetration of its host plants. Carpropamid is a novel melanin-inhibiting fungicide for control of rice blast caused by Magnaporthe grisea. In C. lagenarium, appressorial and colonial melanization were inhibited by carpropamid. Accumulation of melanin intermediates, scytalone, was also shown in the culture medium containing carpropamid. One of the enzymes involved in the melanin biosynthesis, scytalone dehydratase catalyzes the conversion of scytalone to

1,3,8-trihydroxynaphthalene. We previously cloned SCD1 gene coding for scytalone dehydratase of *C. lagenarium*. In this study, a recombinant SCD1 expression vector was constructed using pMAL system and the recombinant scytalone dehydratase was purified from transformed *Escherichia coli*. Recombinant SCD1 showed scytalone dehydratase activity in an in vitro reaction using scytalone as substrate. The activity was assayed by measuring the production of 1,3,8-trihydroxynaphthalene or disappearance of scytalone, which was detectable by reverse-phase high-pressure liquid chromatography. Dehydration of scytalone to 1,3,8-trihydroxynaphthalene was inhibited by carpropamid in the in vitro reaction. (C) 1997 Academic Press.

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ACCESSION NUMBER: 88:83205 CABA  
DOCUMENT NUMBER: 19881112141  
TITLE: The inhibition of melanin biosynthetic reactions in Pyricularia oryzae by compounds that prevent rice blast disease  
AUTHOR: Wheeler, M. H.; Greenblatt, G. A.  
CORPORATE SOURCE: USDA, ARS, SCRL, P.O. Drawer JF, Texas A&M Univ., College Station, TX 77841, USA.  
SOURCE: Experimental Mycology, (1988) Vol. 12, No. 2, pp. 151-160. 31 ref.  
ISSN: 0147-5975  
DOCUMENT TYPE: Journal  
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ENTRY DATE: Entered STN: 1 Nov 1994  
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AB Nine compounds, known to prevent melanin biosynthesis in appressoria of *P. oryzae* and penetration of rice plants via appressoria, inhibited the enzymatic reduction of 1, 3, 6, 8-tetrahydroxynaphthalene and 1, 3, 8-trihydroxynaphthalene to scytalone and vermelone, respectively; they did not inhibit enzymatic reactions that dehydrate scytalone and vermelone to 1, 3, 8-trihydroxynaphthalene and 1,8-dihydroxynaphthalene, respectively. The compounds had the same order of effect in inhibiting reductase reactions as previously reported for preventing penetration of leaf surfaces and inhibiting melanin biosynthesis. Of the 4 strongest reductase inhibitors, tricyclazole, fthalide and pyroquilon are used commercially to prevent rice blast disease and chlobenthiazole is also extremely effective against the disease. Extracts from buff mutants of *P. oryzae* that lack the ability to penetrate leaf surfaces and cause rice blast disease had minimal reductase activity, but carried out normal dehydratase reactions. The buff extracts behaved similarly to those of the wild type treated with strong melanin inhibitors, e.g. tricyclazole. The current in vitro results with cell-free extracts and HPLC techniques complement earlier in vivo results with inhibition of melanin biosynthesis and penetration via appressoria and suggest that the effect of melanin inhibitors on reductase activity can be used to predict their efficacy in preventing rice blast disease.

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L2       462 SEA SCYTALO?(S) DEHYDRATAS?  
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